rubber developments

index—volume 35 1982

THE MALAYSIAN RUBBER PRODUCERS'
RESEARCH ASSOCIATION

Tun Abdul Razak Laboratory
Brickendonbury, Herts SG13 8NL

INDEX

Abrasion resistant pads, 22–23
Accident amelioration, safety bars, 42–43
Addis Ltd, 69
Adelaide, ice rinks, 64–67
Adhesion, rubber on ice, 40–41
Aeon springs, 42–43
Agriculture, silage making, 60–61
Allen, P.W., 17–21
  Hancock Medal, 27
Anatomy, *Hevea brasiliensis*, 99
Andre Ltd, 90–96
Ani bin Arope, *Dato' Haji Dr*, 110
Antiozonants, 24
Anti vibration mountings, 92–96
Articulated joints, drilling towers, 45–49
Asphalt, rubberized, 106
Atkins (W.S.) and Partners, 91
Australia
  ice rinks, 64–67
  railway mounting, 51
Automobiles
  engine mounts, 53–54
  regenerative braking, 53–54
  springs, value added, 32
Awards
  Allen, *Dr* P.W., 27
  Ani bin Arope, *Dato' Haji Dr*, 110
  Sekhar, *Tan Sri Dr* B.C., 25

Bags, silage making, 60–61
Baharum bin Ibrahim, 73
Barnard, D., 44
Barriers, floods, 91
Bearings
  drilling platforms, 45–49
  earthquake protection, 56
  flood barrier sills, 90–91
  marine cutless, 44
  offshore structures, 92–96
  paper making machines, 10–13
  railways, 16
  railway tracks, 33–38
  space shuttles, 84–87
Bechtel Great Britain Ltd, 94
Beloit machines, bearings, 11–13
Birch Products, 68–69
Blends, thermoplastic, 39–40
Blocks, masonry, 22–23
Blowout preventers, 53
Bonding
  railway track bearings, 33–38
  wooden boards, 63
Bond strength, laminated bearings, 86–87
Booster rockets, bearings, 84–87
Bowater Technical Services Ltd, 12
Brazil, seed collection expedition, 14
Bridge bearings, 51–52
  value added, 32
BTR Belting Ltd, 9
BTR Silvertown Ltd, 92–96
Building blocks, cellulose filled, 22–23
Buildings, bearings
  value added, 32
  earthquake protection, 27, 52, 56
  vibration isolation, 52

C. G. DORIS, 45–49
Cain, M.E., 33–38
Calvert, K.O., 98
Canada, paper making, 10–13
Canberra, flooring, 72
Cars
  engine mountings, 52–53
  regenerative braking, 53–54
  springs, value added in manufacture, 32
Castlereagh Dam, 62–63
Castrator rings, 60–61
Cat's eyes, 107
Ceylon Electricity Board, 62–63
Clouth Gummiwerke AG, 9, 33–38, 102–105
Cologne, underground railways, 100–105
Cologne Eggs, 33–38
Columbia space shuttle, 84–87
Competition, DRC determination, 80
Conductive rubber, 109
Conveyor belts
  cement/sand/cellulose, 22
  reconditioning, 7–9
  value added, 32
Cox, D.M., 84–87
Cracking, ozone, 24
Cranes, rubber lined grabs, 23
Crossings (railway), 101–105
Crude oil, prices, 2
Crumb rubber, 15
Crystallization, natural rubber, 70
Curing *see* vulcanization
Cutless bearings, 44
Cutting resistant flooring, 64–67
Cyclized rubber, 108–109
Cyprus Bagdad Company, 9

Dams, seals, 62–63
Date stamps, 83
Davies, Barbara, 4–6
Deep Water Gravity Tower, 45–49
Dehusking rollers, 73
Dental floss, 68–69
Diamond ore scrubbers, 111
DORIS (C. G.), 45–49
Drilling platforms, 45–49
Dry rubber content determination, competition, 80
Durability, flooring, 112
Durastic Ltd, 72
Durometer hardness, 50
Dynamic shear modulus, temperature, 71

Earthquake protection, buildings, 27, 52, 56
Eaton Corporation, 54
Econometric forecasting, 17–18
Effluents, treatment, 15
EINECS, 79

Electricity generation, dams, 62–63
Energy storage (rubber), 53–54
Engineering applications, 51–54
Engine mountings, 52–53
Epoxidized natural rubber, 40
European Core Directory, 79

Farming, silage making, 60–61
Farouk, *Encik* Ahmad, 110
Fatigue life, 97
  marine environment, 49
Fenders, offshore structures, 53
Fertilizers, rubber trees, 15
Film, *Natural Rubber Bearings for Earthquake Protection*, 56
Flashboards, seals, 62–63
Flood barriers, 88–91
Flooring
  ice skating rinks, 64–67
  liners, 72
  longevity, 82, 112
Floss, dental, 68–69
Foam rubber, 107
Footwear, Far Eastern production, 31
Forecasts
  long range, 17–21
  rubber consumption, 30
Fourdrinier machines, bearings, 10–13
Frankfurt, Malaysian Rubber Bureau, 26
Friction, rubber on ice, 40–41
Fungicides, rubber trees, 15

Gaskets, longevity, 83
Glander, *Dr* F., 26
Glass transition, natural rubber, 70–71
Gloves
  Malaysian factory, 4–6
  value added in manufacture, 32
Go Between, 68–69
Gomez, J.B., 99
Graft copolymers, 108
Grips, abrasion resistant, 22–23
Gums, care, 68–69
Guy's Hospital, London, 112

Hallam, W.G., 73
Hallite Seals Ltd, 42
Hancock Medal, 27
Hannam, P.H., 98
Hardness measurement, 50
Harefield Rubber Co, 72
Hashimoto, K., 110
Hawkley SA, 28
Hevea brasiliensis, anatomy, 99
Heveaplus MG, 108
History, tyres, 99
Ho Guat Lye, 73
Holden, Bruce R., 79
Hollow rubber springs, 53
Hong Kong Rapid Transit Railway, 16
Hope Technical Developments, 42
Hose pumps, 54
Hospital flooring, 82, 112

Ice, rubber adhesion, 40–41
Ice rinks, flooring, 64–67

Indentation puncture test, 40–41
India, lignite conveyors, 7–9
Inflation, 2
Information retrieval, 55, 59
Interest rates, 2
International Conference on Natural Rubber for Earthquake Protection, 27
International Natural Rubber Organization, 2
International Rubber Hardness Degrees, 50
International Rubber Research and Development Board, 14, 51–54
    Brazilian meeting, 30–32
International Rubber Study Group, 19, 20, 30–31
International Society for Seismic Isolation, 27
International Specialist Service, 26
Italy, Malaysian Rubber Bureau, 25

Japan, mission to Malaysia, 110
Jones, K.P., 55

Kaida bin Khalid, 80
Kasturi, T.S., 7–9
Köln, underground railways, 33–38, 100–105
Korea
  Malaysian Rubber Bureau, 55
  mission to Malaysia, 110
  natural rubber consumption, 31

Laminated bearings
  flood barriers, 90–91
  space shuttles, 84–87
  underwater, 45–49
Laminated rubber bearings, offshore structures, 92–96
Latex, 106
  colloidal stability, 41
  foam rubber, 107
  gloves, 4–6
Leyland and Birmingham Rubber Co Ltd, 112
Life expectancy, engineering components, 49
Lignacite (North London) Ltd, 22–23
Lignite, conveyor belts for, 7–9
Liners, flooring, 72
Linings, rotary drums, 111
Load cells, rubber, 28
Locomotives, rubber springs, 106–107
London, flood barriers,
Longevity, 82–83
  flooring, 112
  railway mounting, 51
Long range forecasts, 17–21
Lorries
  rubber lined grabs, 23
  safety bars, 42–43
Low-temperature properties, 48–49, 70–71
LRC (Malaysia) Sdn Berhad, 4–6

Mahmood, B.A., 26
Malaysia
  Deputy High Commissioner, 55
  Deputy Prime Minister, 27
  glove factory, 4–6
  Japanese mission, 110
  Korean mission, 110
Malaysian Railways, 16

Malaysian Rubber Bureaux, 59
Europe, 25
Frankfurt, 26
Korea, 55, 110
United States, 79
Malaysian Rubber Producers' Research Association
Annual Report, 39–41
Thames Barrier, 91
visit of Deputy High Commissioner, 55
Malaysian Rubber Research and Development Board
drc competition, 80
earthquake conference, 27
International Specialist Service, 26
Marine applications
cutless bearings, 44
fenders, 53
gravity towers, 45–49
oil production platforms, 92–96
Masonry blocks, 22–23
Mathematical models, 20
Mats, vibration isolation, 102–105
Microprocessor control, 40–41
Mini-estates, 74–78
Modified natural rubbers, 108–109
Modulus, 97
Mountings
anti vibration, 92–96
engine, 52–53
railway tracks, 33–38, 51
Mullins, *Dr* L., 30–31, 39, 51–54, 56
Musa Hitam, *Datuk*, 27
Musket tompions, 83

Nambiar, Jay, 73
Natural rubber
consumption in tyres, 30–32
EINECS, 79
longevity, 82–83
long range forecasts, 17–21
modified, 108–109
prices, 2—3
Neoprene *see* polychloroprene
Newsprint making machinery, bearings, 10–13
Neyveli Lignite Corporation, 7–9
Nik Husain, 55
Noise isolation, railways, 33–38, 100–105
Nor, *Dr* Mohd bin Abdullah, 74–78
North Sea, oil production platforms, 92–96
Nozzles, space shuttles, 84–87

Offshore structures
ball joints, 45–49
fenders, 53
oil production platforms, 92–96
Oil consumption, 2
Oil crisis, 20
Oil prices, 2
Oil production platforms, 92–96
Oil rigs, 45–49
Ordre des Palmes Academiques, 110
Ozone cracking, 24, 83

Paddy dehusking rollers, 73
Paper making machinery, bearings, 10–13
Paragon Rubber Co Ltd, 60–61
Peel tests, 86
Pelham Bridge, 51
Pieris (Richard) and Co Ltd, 63
Planters' Conference (1981), 71
Plasticized natural rubber, 85–86
Points (railway), 101–105
Polychloroprene, low temperature stiffness, 48–49
Polyurethane
bearings, 34
flooring, 66
Poverty, rubber smallholders, 75
Preece Cardew and Rider, 62–3
Proofed fabrics, vapour permeable, 109
Pumps, hose, 54

Radial ply tyres, 3
value added, 32
Rahman bin Mohd. Rais, Abdul, 73
Railpads, 16
Railways
bearing pads, 16
locomotive springs, 106–107
mountings, 51
noise isolation, 33–38, 100–105
vibration isolation, 52
Rallye MS Plus Super 60, 56
Ramakrishnan, R., 44
Reconditioning, conveyor belts, 7–9
Regenerative braking (rubber), 53–54
Relaxed modulus, 97
Replanting, mini estates, 75–77
Retirements
Glander, *Dr* F., 26
Holden, Bruce R., 79
Reviews
Anatomy of Hevea *and its Influence on Latex Production*, 99
History of the Pneumatic Tyre (Tompkins), 98
Natural Rubber Marine Cutless Bearing Manufacture, 44
Paddy Dehusking Roller Manufacture, 73
Polymer Latices and their Applications (Calvert), 98
Proceedings of the RRIM Planters' Conference 1981, 71
Rheinische Braunkolenwerke, 9
Rheological properties, SMR 20, 41
Rice, dehusking rollers, 73
Richard Pieris and Co Ltd, 63
Rings, bag sealing, 60–61
RISDA, 74–78
Rising rate springs, 43, 53
Roads, rubberized asphalt, 106
Rockets, bearings, 84–87
Rollers, paddy dehusking, 73
Rotary drums, linings, 111
Rubber Developments, 106–109
Rubber effluent, treatment, 15
Rubber Industry Smallholders' Development Authority, 74–78
Rubber Latex Ltd, 61
Rubber Research Institute of Malaysia
Annual Report, 14–16
collaboration with MRPRA, 39
earthquake conference, 27
Planters' Conference, 71

Safe T bars, 42–43
Salleh bin Subari, 55, 110
Salts, effect on ice adhesion, 40–41
SBR, fatigue life, 97
Scrubbers, 111
Seals, dams, 62–63
Sea water durability, 49
Sedillot, F., 45–49
See Toh Mook Sang, 44
Sekhar, *Tan Sri Dr* B.C., 3, 27, 30, 41, 80
  Tun Abdul Razak Award, 25
Semtex Ltd, 72
Seoul, Malaysian Rubber Bureau, 55
Sewer gasket, longevity, 83
Shear modulus, temperature, 71
Ships, flooring, 72
Shock cells, 53
Shore durometer, 50
Silage making, 60–61
Sills, bearings, 90–91
Silvercord conveyor belts, 9
Sin Siew Weng, 44, 73
Skating rinks, flooring, 64–67
Smallholders, mini estates, 74–78
Smit, H.P., 20
Smith, J.F., 26, 86
Smithsonian Institute, 83
SMR 20, flooring, 65
SMR GP, promotional mission, 26
South Australian Ice Centre, 64–67
Space shuttles, bearings, 84–87
Springs
  hollow rubber, 42–43, 53
  locomotives, 106–107
  rising rate, 53
Sri Lanka, dam seals, 62–63
Stability, latex concentrate, 41
Standard Malaysian Rubber
  rheological properties, 41
  SMR 20, 65
Starr Rubber Mills, 65–67
Stevenson, A., 45–49
Strips (rubber), dental floss, 68–69
Suk Gyoo Chung, 110
Suspensions, hollow rubber springs, 53
Swift, P.McL., 99
Synthetic rubbers, 82, 106

Taiwan, natural rubber consumption, 31
Tamil Nadu, lignite conveyors, 7–9
Tapping, 14–15
Technical Advisory Service, 59
Technical enquiries, 59
Technically classified rubber, 107–108
Teeth, dental floss, 68–69
Temperature, operating for NR, 70–71
Tennis courts, 107
Thames Barrier, 88–91
Thermoplastic natural rubber, 39–40
Thiokol Corporation, 84–87
Thirty years ago, 106–109
Tiles (rubber), 65–67
Timber boards, bonding seals to, 63
Tompions, muskets, 83
Tompkins, Eric, 99
Trees (rubber)
  fertilizers, 15
  fungicides, 15
  seed collection, 14
  tapping, 14–15
  wood, 16
Trigg, D.W., 19
Trucks
  rubber lined grabs, 23
  safety bars, 42–43
Tun Abdul Razak Award, 25
Tyres
  all natural rubber, 16
  factory closures, 3
  history, 99
  longevity, 83
  natural rubber consumption, 30–32
  production in South East Asia, 32
  research, 40
  value added in manufacture, 32
  winter, 56

Uderstadt, D., 34–35
Underground railways, noise isolation, 33–38, 52, 100–105
Underwater bearings, 45–49
Unemployment, 3
UNIDO, 27
Uniroyal Englebert, winter tyres, 56
Urethane vulcanization, 53

Value added, rubber goods manufacture, 32
Vapour permeable fabrics, 109
Vibration isolation
  buildings, 52
  railways, 100–105, 33–38
Vienna, underground railway, 34
Vulcanization, urethane, 53

Warman International, 111
Wave power, 54
Waxes, ozone protection, 24
Wear resistant flooring, 64–67
Weighbridges, 28
Winter tyres, 56
Wood
  bonding seals to, 63
  rubber tree, 16
World rubber consumption, 17–21
  forecasts, 30

Your questions answered, 58–59
  fatigue life, 97
  hardness measurement, 50
  ozone cracking, 24
  relaxed modulus, 97
  temperature range for NR, 70–71

Zainal Abidin bin Mokhtar, 55
Zainal Farid, M.Z., 26
Zhu Guoyo, 80

Printed by The Leagrave Press Ltd, Luton and London